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ammonia (22° B.), and add the solution to twenty-five gallons of water.

Dr. Thaxter of the Connecticut Experiment Station suggests that a very large saving may be made by preparing the carbonate of copper by the following method, instead of buying it, as its market price is much greater than that of the materials necessary for its preparation. Take two pounds of sulphate of copper and dissolve it in a large quantity of hot water; in another barrel or tub dissolve two and one-half pounds of carbonate of soda (sal soda) in hot water. When both are dissolved and cooled, pour the soda solution into the copper solution, stirring rapidly. There will result a blue-green precipitate of carbonate of copper, which must be allowed to settle to the bottom of the vessel. Now draw off the clear liquid above the sediment, fill the vessel with fresh water, and stir up the contents thoroughly. After the copper carbonate has once more settled to the bottom, again draw off the clear fluid above. The carbonate may now be removed from the vessel and dried, when it is ready for use. From the amount of blue-stone and sal soda given above will be produced one pound of copper carbonate, and the amount of each necessary to produce any given amount of copper carbonate is easily calculated.

Sulphate of copper is used in solutions of varying strength for certain special cases.

Sulphide of potassium, known also as sulphuret of potassium or liver of sulphur, has been found useful in the treatment of diseases caused by those fungi known as "powdery mildews," especially on plants grown under glass. It is ordinarily used in the proportion of half an ounce of the sulphide to one gallon of water.

The one of the above fungicides chosen as most available under existing conditions is now to be applied to the plants which it is desired to protect against disease. In the special case of the grain smuts, the only effectual treatment is that applied to the seed-grain, since these fungi depend for their propagation upon the spores which adhere to the grain and germinate with it. They cannot attack the host-plant after it has fairly passed the seedling stage, and the adhering spores may be killed before planting without injury to the seed. But ordinarily the fungicide must be thoroughly applied to the whole of each growing plant in the form of a fine spray, so that the plant is completely wet, but not flooded. Perhaps a practical measure of the proper amount of a fungicide to be applied to a plant may be obtained by stopping as soon as the plant is wholly wet, and before the solution begins to drip from it. In order to insure a fine and even spray and economy of materials, especial care should be used in securing proper nozzles. The ordinary spraying-nozzles used with hose or with small hand-pumps are utterly unsuited to this purpose.

As has been said, the question when to apply is of the first importance in dealing with any disease, but the answer varies with the case in hand. In general, however, let it be remembered that all treatment is preventive, that plants once attacked are lost, and that spraying must therefore be prompt and early. In the case of a disease of an herbaceous crop like potatoes, the first spraying should be given at once on the appearance of the disease in any part of the field or in a neighboring field. The same applies to diseases of woody plants, which have previously been free from disease; but where grapes or apples, for instance, were attacked last year, treatment should begin with the beginning of growth, and should proceed on the assumption that the disease will reappear if not prevented. In any case, after spraying is begun, it must be repeated until danger is past (a very variable period) at intervals which may average ten days or two weeks, but will vary according to circumstances, depending especially on the amount of rainfall, which washes the copper salts from the plants, and renders a new application necessary. It is always best to leave an occasional plant or row of plants untreated among the treated ones, to furnish a basis for judgment as to the efficacy of the treatment.

It is earnestly hoped that many persons in the State who have suffered in the past from fungous diseases will this year undertake definite measures to avoid such losses, and will communicate early their intention to do so to the station.

SCHOOL OF APPLIED ETHICS, SUMMER SESSION.¹

BEGINNING early in July, and continuing six weeks, there will be held at some convenient summer resort in New England or New York a school for the discussion of ethics and other subjects of a kindred nature. The matter to be presented has been selected with regard to the wants of clergymen, teachers, journalists, philanthropists, and others who are now seeking careful information upon the great themes of ethical sociology. It is believed that many collegiate and general students will also be attracted by the programme. Speakers and subjects will be, so far as arranged, as follows:—

I. Department of Economics, in charge of Professor H. C. Adams, Ph.D., of the University of Michigan.

Professor Adams will deliver eighteen lectures (three during each of the six weeks) on the history of industrial society in England and America, beginning with the middle ages, and tracing genetically the gradual rise of those conditions in the labor world which cause so much anxiety and discussion to-day.

Along with this main course will be presented (1) three lectures by President E. Benjamin Andrews, — one on the evils of our present industrial system, one on socialism as a remedy, and one on the better way; (2) three lectures by Professor Frank W. Taussig, Ph.D., — one on distributive and credit co-operation, one on productive co-operation and profit-sharing, and one on workmen's insurance; (3) three lectures by Hon. Carroll D. Wright on factory legislation; (4) three lectures by Professor J. B. Clark, Ph.D., on agrarian questions, discussing rent and tenure, and considering the agrarian element in the farmers' alliance movement; (5) three lectures by Albert Shaw, Ph.D., — one on the housing of the poor in Paris, one on the housing of the poor in London, and one on Gen. Booth's scheme for relieving poverty (the first two of these lectures will have especial reference to the question of rapid-transit facilities in cities); (6) three lectures by Professor E. J. James, Ph.D., on labor and industrial legislation in Europe.

In addition to the above, two lectures are expected from Mr. Henry D. Lloyd of Chicago, giving chapters in the industrial history of the United States.

If there be sufficient demand for it, special instruction in the principles of economics will be provided.

II. Department of the History of Religions, in charge of Professor C. H. Toy, D.D., of Harvard University.

Professor Toy will offer a general course of eighteen lectures, extending through the six weeks, treating the history, aims, and method of the science of history of religions, and illustrating its principles by studies in the laws of religious progress, with examples drawn from the chief ancient religions. Among the topics will be the classification of religions, conceptions of the Deity, religion and superstition, sacrifice and the priesthood, the idea of sin, religion and philosophy, religion and ethics, sacred books, religious reformers and founders.

The provisional scheme for the special courses is as follows: "Buddhism," Professor M. Bloomfield, Johns Hopkins University; "The Babylonian-Assyrian Religion," Professor M. Jastrow, University of Pennsylvania; "Mazdeism," not yet provided for; "Islam," Professor G. F. Moore, Andover Theological Seminary; "The Greek Religion," not yet provided for; "The Old Norse Religion," Professor G. L. Kittredge, Harvard University.

It is hoped also to arrange a set of Sunday-evening lectures, in which the positions of various religious bodies, Catholic, Protestant, and Jewish, will be expounded by prominent members of these bodies.

III. Department of Ethics, in charge of Professor Felix Adler, Ph.D., of New York.

Professor Adler will offer a general course of eighteen lectures, extending through the six weeks, on the system of applied ethics, including a brief survey of the various schemes of classification adopted in ancient and modern ethical systems, the discussion of the relation of religious to moral instruction, of the development of the conscience in the child, etc. The scheme of duties treated will embrace personal ethics, social ethics in general, the ethics of

¹ From April number, *International Journal of Ethics*.

the family, the ethics of the professions, the ethics of politics, the ethics of friendship, the ethics of religious association. The scheme of duties will be treated with special reference to the moral instruction of children.

The provisional programme for the special courses in this department is as follows: "Introduction to an Ethical Theory," three lectures by W. M. Salter; "The Treatment of the Criminal by the State," three lectures by Dr. Charlton T. Lewis; "Ethics and Jurisprudence;" "The Ethical Ideal of the State;" "History of Temperance Legislation." The names of special lecturers not given will be announced later.

The tuition for the entire school, including all the lectures in the three departments, will be ten dollars. Notice of the place determined upon will be published at an early date. For fuller information in reference either to the instruction or to arrangements for boarding, and the like, application should be made to Professor H. C. Adams, dean of Summer School of Applied Ethics, 1602 Chestnut Street, Philadelphia, Penn.

HEALTH MATTERS.

Vaccination in France.

THE *London Medical Recorder*, Feb. 20, 1891, says, "The French Academy of Medicine is just now the scene of a struggle between those who are in favor of a law making vaccination compulsory, and the others who think that the present permissive system goes as far as is consistent with personal liberty. The general in command of the 'volunteers,' that is to say, of those who object to compulsory protection, is no less an authority than Professor Léon Le Fort, and last week he made a vigorous rally from behind his intrenchments, and, with heavy artillery in the shape of arguments, he prevented the further advance of the attacking forces. There are several points in Professor Le Fort's address which merit attention, especially as the matter is at present under consideration in this country. First of all, — and the news will come as a surprise to those who have been in the habit of regarding France as being at the prow of civilization, — all statistics based on the mortality returns from the different diseases must be incomplete, and therefore misleading, for the cause of death is only recorded for statistical purposes in the more important French towns, and presumably not at all in the rural and smaller urban districts. What the total annual mortality from small-pox in France may be, can therefore only be matter of conjecture. Still, the professor admits that it is certainly higher than it ought to be or need be. Another fact, hardly to the credit of French provincial authorities, is, that nowhere outside Paris is any attempt made to isolate the sufferers from small-pox. He is therefore compelled to fall back upon the Paris returns; and these show that the mortality has been steadily diminishing, from 32 per 100,000 inhabitants, during the period 1865-76, 55 per 100,000 in 1880-87, to 5 per 100,000 in 1889. The returns of the Small-pox Hospital at Aubervilliers testify to the same diminution, the admissions and deaths having been as follows: —

	Admissions.	Deaths.
1887.....	1,400	215
1888.....	1,079	152
1889.....	706	63
1890.....	363	37

"There are no available means of ascertaining the proportion of cases of small-pox per 100,000 inhabitants in the country, still less the proportion of deaths to cases of infection. We are, however, told that country doctors have the greatest difficulty in procuring lymph, and the people have the greatest difficulty in getting vaccinated, even supposing they were so disposed.

"Let us compare these figures with the German statistics. It must be borne in mind that vaccination has been compulsory

throughout Germany since 1835, and in some parts since 1815. The returns are as follows: —

	Deaths per 100,000 Inhabitants.
1834.....	54
1836.....	19
1847.....	9
1856.....	7

"In 1865 the war led to a relaxation of the stringent rules in respect of isolation, and forthwith the number of deaths from small-pox jumped up to 46 per 100,000, and in the following year to 62. During the Franco-German war, small-pox was imported into Germany by the returning soldiers, and more particularly by the French prisoners of war; and the mortality from variola in 1871 attained 59,839, and 77,000 in 1872, equal to 233 per 100,000 civilians, and 31 per 100,000 of the military population. In 1874 the vaccination law was consolidated, and a vaccination service founded for the supply of lymph, and by 1877 the number of deaths (810 in 1876) had fallen to 88. This level, however, was not maintained, for in 1882 the figures had again risen to 1,007. Thereupon the German Government enjoined more stringent measures for isolation, and then the downward tendency returned, and in 1886 the number of deaths was 140 only.

"In England in 1885 — a time when vaccination had long been in full swing, but when isolation was not seriously enforced — the number of deaths from small-pox in London alone was 1,419. In 1886 the number fell abruptly to 24; in 1888, to 9; and in 1889, to 1. This diminution coincided with the introduction of isolation on a large scale, which reached its apogee with the law for compulsory notification in 1889.

"Professor Le Fort argues from these figures, that, though vaccination has an undoubted and valuable influence in affording protection and in mitigating the severity of the disease, the most effective and reliable means of preventing the spread of the disease is rigorously enforced isolation.

"While it is impossible to deny the salutary influence of isolation, it seems a trifle inconsistent to object to vaccination as an infringement of the liberty of the subject, while rallying to the principle of compulsory isolation, which is as directly in contravention of personal liberty as any measure well could be. To take a patient, *non volens*, and shut him up for eight long weeks in a hospital, is surely as obvious an attack on his liberty as to insist on his submitting to the trivial operation of vaccination. This question of personal liberty, unfortunately, does not admit of any categorical reply. Different people have different ideas as to what constitutes liberty, and as to what limits, if any, are to be assigned to its play. Still, the great object that we have in view, is to secure cheerful submission to an infliction imposed by reason rather than by law; and if this could be attained by persuasion, instead of coercive legislation, then the choice would be easy."

NOTES AND NEWS.

THE Legislature of Arkansas has continued the geological survey of that State, and Dr. J. C. Branner has been re-appointed State geologist by the governor. It is expected that the work will be completed during the next two years. A report on manganese will be published by this survey in about a month.

— Miss Emma Garrett has resigned her position of principal of the Pennsylvania Oral School for the Deaf, to take effect June 20, in order to devote her time to establishing a home for the training in speech of deaf children before they are of school age. Miss Garrett will continue her Normal Training School for Teachers of the Deaf, established in 1881. She will have a summer school this year to accommodate some teachers desiring training at that time. For further particulars address her at Scranton, Penn.

— Bulletin No. 12 of the Hatch Experiment Station of the Massachusetts Agricultural College is a report on insects, by C. H. Fernald of the Division of Entomology. The history of the insects, and the methods of destroying or holding them in check, have been worked out at the station or compiled from the most reliable sources. This last has been done because there have been